

Fuel Cell Installation and Demonstration Project In Gallatin County, Montana

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Objectives

- Demonstrate operation of fuel cells and provide the hydrogen industry and the general public with a high-technology application of the units.
- Determine the degradation rate of the fuel cells and the point at which it becomes economically necessary to "restack" by essentially replacing the fuel cells themselves.
- Provide operational data to the Montana State University Electrochemical Engineering Research and Education Center to assist in the development of control equipment to optimize fuel cell performance when combined with other electrical sources.
- Maximize efficiency of the heat recovery (cogeneration) system.

Technical Barriers

This project addresses the following technical barriers from the Hydrogen, Fuel Cells and Infrastructure Technologies Program Multi-Year R,D&D Plan:

Fuel Cells section

- E. Durability
- F. Heat Utilization

Technology Validation section

- I. Hydrogen and Electricity Coproduction

Education section

- B. Lack of Demonstrations or Examples of Real World Use

Approach

- Construct suitable stationary fuel cell installation site at a high-tech facility.
- Install redundant stationary fuel cells.
- Operate stationary fuel cells according to manufacturing and engineering specifications.
- Study/analyze performance and reliability of installed fuel cells based on operational data collection.
- Work in conjunction with Montana State University (MSU) to enhance complimentary fuel cell studies.

Accomplishments

- Completed construction and preparation of fuel cell installation site and related electrical/mechanical systems. (October, 2002)
- Purchased two (2) 250-KW stationary fuel cells from Pennsylvania Power and Light, engineered and manufactured by Fuel Cell Energy (FCE). (October, 2002)
- Facilitated physical installation and start-up of purchased fuel cells. (June, 2003)

Future Directions

- Finalize interconnection agreement with local energy supplier (Northwestern Energy) to allow for sale of surplus electricity.
 - Capture and analyze data applicable to reliability and performance of fuel cells.
 - Continue providing access to MSU for monitoring and analysis purposes.
 - Investigate formation of local "micro-grid" to allow for expansion and distribution of demonstration site installation to neighboring facilities.
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Introduction

In December 2001, a Design Team Conference was held at Zoot Enterprises, Inc. headquarters in Bozeman, Montana, to address basic design and operation issues relating to fuel cell installation and ownership. At this time, parties were designated to assist with architectural, engineering, construction, and installation tasks.

Two (2) 250-KW fuel cells were delivered and installed at the Zoot Enterprises facility in June 2003. Both units have completed the warm-up process and are currently being brought to full generation capacity.

Approach

Zoot Enterprises has taken an active role in the design, construction, and installation phases. It is expected that through this active involvement, we will be most successful in meeting the objectives of this project.

Monitoring systems and devices have been installed both by MSU and also as part of the fuel cell package supplied by FCE. Zoot Enterprises will collect supplemental operational data through maintenance records, billing records, and demonstration experiences.

Results

No results are available at this time, as the fuel cell operation phase has not begun. Installation is in progress.

Conclusions

As the operational phase of this project is due to begin in July 2003, no conclusions have been formulated from this project at the current time.

FY 2003 Publications/Presentations

1. Department of Energy - Technical Progress Report - October 2002
2. Department of Energy - Technical Progress Report - March 2003

Special Recognitions & Awards/Patents Issued

1. "Fuel Cells Delivered to Zoot Technologies" - June 18, 2003 article - Bozeman Daily Chronicle